

AMENDMENTS TO THE CLAIMS

1. (CURRENTLY AMENDED) An apparatus comprising:

★ an external memory;

a first circuit configured to (i) copy a plurality of first reference samples of a first reference image from said external memory, said first reference samples being proximate a first offset from a first corner of said first reference image and (ii) generate a first motion vector corresponding to a first current block of a current image by searching among said first reference samples; and

a second circuit configured to (i) copy a plurality of second reference samples of said first reference image from said external memory, said second reference samples being proximate a second offset from said first corner of said first reference image, said second offset being different than said first offset and said second reference samples being non-adjacent said first reference samples and (ii) generate a second motion vector corresponding to said first current block by searching among said second reference samples,

wherein (i) said first offset comprises a small offset pointing to a first position in said first reference image, said first position being approximately co-located with a center of said first current block ~~generated from a still region of said current~~

image and (ii) said second offset comprises a large offset pointing to a second position in said first reference image, said second position being distant from said first position and said second position corresponding to a global offset associated with fast moving data in said current image generated from a moving region of said current image.

2. (CURRENTLY AMENDED) The apparatus according to claim 1, wherein said first circuit comprises a search memory (i) having a read port and a write port, said write port being separate from said read port and (ii) configured to store said first reference samples copied from said external memory.

3. (CANCELED).

4. (CURRENTLY AMENDED) The apparatus according to claim 2, wherein said first circuit further comprises ~~a~~ an external read control circuit configured to generate a first read address to read from said external memory.

5. (ORIGINAL) The apparatus according to claim 4, wherein said first circuit further comprises a write control circuit configured to generate a write address to write to said search memory.

6. (PREVIOUSLY PRESENTED) The apparatus according to claim 5, wherein said first circuit further comprises an internal read control circuit configured to generate a second read address to read from said search memory.

7. (CURRENTLY AMENDED) The apparatus according to claim 1, wherein said first circuit is further configured to (i) copy a plurality of third reference samples of said first reference image from said external memory and (ii) generate a third motion vector corresponding to a second current block of said current image by searching among said third reference samples and at least a first portion of said first reference samples, said second current block being horizontally adjoining said first current block in said current image.

8. (CANCELED).

9. (CURRENTLY AMENDED) The apparatus according to claim 7, wherein said third reference samples are spatially adjoining said first reference samples in said first reference image.

10. (CURRENTLY AMENDED) The apparatus according to claim 1, further comprising:

a third circuit configured to (i) copy a plurality of third reference samples of a second reference image from said
5 external memory, said third reference samples having a third offset from a second corner of ~~a~~ said second reference image and (ii) generate a third motion vector corresponding to said first current block by searching among said third reference samples.

11. (CURRENTLY AMENDED) A method for motion estimation, comprising the steps of:

(A) copying a plurality of first reference samples of a first reference image from ~~a~~ an external memory to a first circuit,
5 said first reference samples having a first offset from a first corner of said first reference image;

(B) generating a first motion vector corresponding to a first current block of a current image by searching among said first reference samples using said first circuit;

10 (C) copying a plurality of second reference samples of said first reference image from said external memory to a second circuit, said second reference samples being proximate a second offset from said first corner of said first reference image, said second offset being different than said first offset and said
15 second reference samples being non-adjacent said first reference samples; and

(D) generating a second motion vector corresponding to said first current block by searching among said second reference samples using said second circuit, wherein (i) said first offset comprises a small offset pointing to a first position in said first reference image, said first position being approximately co-located with a center of said first current block ~~generated from a still region of said current image~~ and (ii) said second offset comprises a large offset pointing to a second position in said first reference image, said second position being distant from said first position and said second position corresponding to a global offset associated with fast moving data in said current image ~~generated from a moving region of said current image.~~

12. (CANCELED).

13. (CANCELED).

14. (CURRENTLY AMENDED) The method according to claim 19 ~~13~~, wherein said third references samples spatially adjoin said first reference samples in said first reference image.

15. (PREVIOUSLY PRESENTED) The method according to claim 19, wherein the steps of generating said first motion vector and

copying said third reference samples are performed substantially simultaneously.

16. (CURRENTLY AMENDED) The method according to claim 19, further comprising the steps of:

overwriting some of said first reference samples with a plurality of fourth reference samples of said first reference image
5 copied from said external memory; and

generating a fourth motion vector corresponding to a third current block of said current image by searching among said fourth reference samples, said third reference samples and at least a second portion of said first reference samples, said third
10 current block being horizontally adjoining said second current block in said current image.

17. (CANCELED).

18. (CANCELED).

19. (CURRENTLY AMENDED) The method according to claim 11, further comprising the steps of:

copying a plurality of third reference samples from said external memory to said first circuit and

5 generating a third motion vector corresponding to a second current block of said current image by searching among said third reference samples and at least a first portion of said first reference samples, said second current block being horizontally adjoining said first current block in said current image.

20. (CURRENTLY AMENDED) An apparatus comprising:

means for storing a first reference image;

means for (i) copying a plurality of first reference samples of said first reference image from said means for storing, 5 said first reference samples being proximate a first offset from a first corner of said first reference image and (ii) generate a first motion vector corresponding to a first current block of a current image by searching among said first reference samples; and

means for (i) copying a plurality of second reference 10 samples of said first reference image from said means for storing, said second reference samples being proximate a second offset from said first corner of said first reference image, said second offset being different than said first offset and said second reference samples being non-adjacent said first reference samples and (ii)

15 generating a second motion vector corresponding to said first current block by searching among said second reference samples, wherein (i) said first offset comprises a small offset pointing to a first position in said first reference image, said first position

being approximately co-located with a center of said first current
20 ~~block generated from a still region of said current image~~ and (ii)
said second offset comprises a large offset pointing to a second
position in said first reference image, said second position being
distant from said first position and said second position
corresponding to a global offset associated with fast moving data
25 in said current image ~~generated from a moving region of said~~
~~current image.~~

21. (CURRENTLY AMENDED) The apparatus according to claim
1, wherein said first offset comprises a zero offset generated from
said a still region of said current image.

22. (CURRENTLY AMENDED) The apparatus according to claim
1, further comprising a memory sub-system configured to control
communication between (i) said external memory and said first
circuit and (ii) said external memory and said second circuit.

23. (CURRENTLY AMENDED) The method according to claim
11, further comprising the steps of:

copying a plurality of third reference samples of a
second reference image from said external memory to a third
5 circuit, said third reference samples having a third offset from a
second corner of ~~a~~ said second reference image; and

generating a third motion vector corresponding to said first current block by searching among said third reference samples using said third circuit.

24. (PREVIOUSLY PRESENTED) The method according to claim 23, wherein (i) said first motion vector comprises a forward prediction and (ii) said third motion vector comprises a backwards prediction.

25. (CURRENTLY AMENDED) The method according to claim 11, wherein said first offset comprises a zero offset generated from ~~said~~ a still region of said current image.

26. (NEW) The apparatus according to claim 7, wherein generation said first motion vector and copying said third reference samples are performed substantially simultaneously.

27. (NEW) The apparatus according to claim 7, wherein the first circuit is further configured to (i) overwrite some of said first reference samples with a plurality of fourth reference samples of said first reference image copied from said external
5 memory and (ii) generate a fourth motion vector corresponding to a third current block of said current image by searching among said fourth reference samples, said third reference samples and at least

a second portion of said first reference samples, said third
current block being horizontally adjoining said second current
10 block in said current image.